# National Council for Science and the Environment

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**Testimony of**
**Donald Langenberg, Ph.D., Vice Chairman**
**National Council for Science and the Environment**

**Regarding**
**"EPA's FY 2007 Science and Technology Budget Proposal"**

**To the**
**Subcommittee on Environment, Technology, and Standards**
**Committee on Science**
**U.S. House of Representatives**

**March 16, 2006**

## Summary

In order to fulfill its mission, EPA needs increased investments in both its intramural and extramural science programs. The National Council for Science and the Environment (NCSE) urges Congress to appropriate a minimum of $700 million for EPA's Office of Research and Development (bringing it back to FY 2004 levels), including at least $150 million for EPA's Science to Achieve Results (STAR) research grants program and $20 million for EPA's STAR graduate fellowship program. We recommend a total of $ 900 million for EPA's Science and Technology account. NCSE also urges Congress to restore full funding for the Office of Environmental Education at a level of at least $10 million.

The National Council for Science and the Environment is dedicated to *improving the scientific basis for environmental decisionmaking*. We are supported by over 500 organizations, including universities, scientific societies, government associations, businesses and chambers of commerce, and environmental and other civic organizations. NCSE promotes science and its essential role in decisionmaking but does not take positions on environmental issues themselves.

## Introduction

Mr. Chairman, thank you for the opportunity to testify at this important hearing on science and technology at the Environmental Protection Agency (EPA). My name is Don Langenberg. I am testifying in my capacity as Vice Chair of the National Council for Science and the Environment (NCSE). I am also Chancellor Emeritus of the University System of Maryland and Professor of Professor of Physics and Electrical Engineering at the University of Maryland. I bring several perspectives to this hearing. I have served as Deputy Director and Acting Director of the National Science Foundation (NSF), President of the American Association for the Advancement of Science (AAAS), President of the American Physical Society (APS), and Chairman of the Executive Committee of the National Association of State Universities and Land Grant Colleges (NASULGC).

In my capacity as Chancellor of the University System of Maryland, I was a leader of an institution that receives large amounts of federal funding for research and education. In my capacity as Deputy Director and Acting Director of the National Science Foundation, I was a leader of an institution that provides a significant fraction of the total federal investment in research and education at our nation's universities. I am both a scientist and a science educator. From 2002-2004, I served as Regents' Professor of Education at the University of Maryland.

I am a physicist by training, but I am not here to discuss the physical sciences. Just as Harold Varmus, the eminent biologist and former director of the National Institutes of Health, made a strong case for the need for greater investments in the physical sciences, I am a physicist who is here to discuss the importance of greater investments in environmental research and education.

**Environmental Science and Decisionmaking**

The call for decisions, environmental and otherwise, to be made on the basis of science is almost a mantra used across the political spectrum. Yet, behind the rhetoric, a simple truth remains. Without investment in science and in scientists, there can be no science-based decisionmaking.

Despite this statement of the obvious, many federal departments and agencies and those in Congress who fund them try to get environmental decisionmaking on the cheap. In real dollar terms, **EPA's funding of science is nearly unchanged since 1990** (Figure 1). During this time, the complexity of the challenges has increased many-fold. Science has helped us to make great advances with the local issues of point-source pollution. The problems faced by EPA, our nation and our planet today encompass local, regional, national and even global scales.

EPA's current list of high priority research areas includes:

- Human Health
- Particulate Matter
- Drinking Water
- Clean Water
- Global Change
- Endocrine Disruptors
- Ecological Risk
- Pollution Prevention
- Homeland Security

Half of these issues were largely unknown 25 years ago, yet the amount of available funding is largely unchanged.

A research budget of less than $600 million for an agency dealing with these challenges is simply unacceptable. In contrast, the National Institutes of Health (NIH) receives nearly $30 billion (50 times more than EPA research). Yet we increasingly understand the connection between environmental quality and human health. For example, reducing methane emissions by 20 percent could prevent 370,000 deaths worldwide between 2010 and 2030, say Princeton

University researchers in *Proceedings of the National Academy of Sciences* last week (March 6, 2007).

EPA's strategic plan calls for science-based decision making, but it's not possible to achieve this goal if the agency's capacity to conduct science is continually reduced. EPA's strategic plan for 2003-2008 says, "EPA has identified reliance on sound science and credible data among the guiding principles we will follow to fulfill our mission to protect human health and the environment." EPA needs to reverse the decline in its capacity to conduct science in order to fulfill its mission.

## EPA's proposed science budget

Under the President's FY 2007 budget, EPA's overall budget would fall $310 million or 4.1 percent to $7.3 billion, after a similar cut in 2006. EPA's R&D portfolio of $557 million would suffer a $37.5 million (6 percent cut), after a similar cut in 2006. Funding for most EPA research areas would decline, with the exception of homeland security R&D. **EPA's R&D funding would fall to its lowest level in almost two decades in real terms** (Figure 1). If EPA's FY 2007 budget proposal were enacted, the agency's Science and Technology (S&T) funding will have declined by $71 million (12 percent) since FY 2004 and the Office of Research and Development budget will have declined by $90 million (14 percent) during the same period.

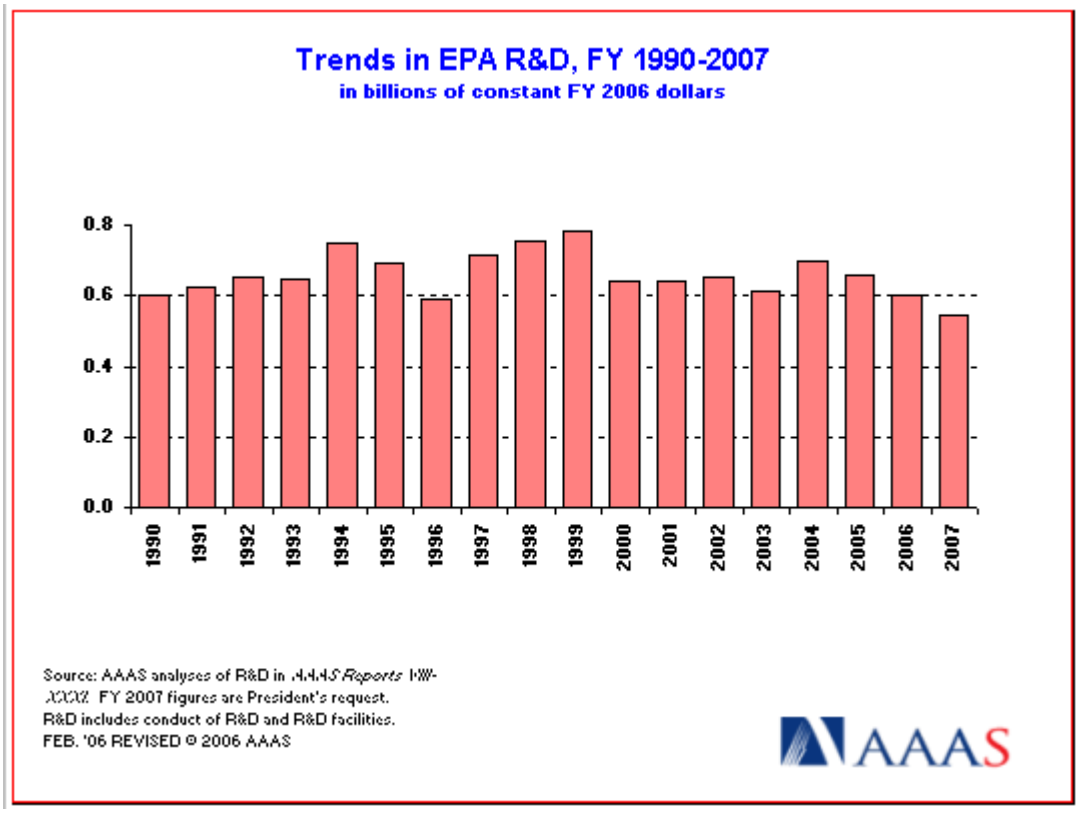

Figure 1. Trends in EPA R&D, FY 1990-2007 in real dollars.

A healthy research program depends on having sufficient resources to:

a. keep up with and use the newest scientific methods,
b. provide the most up-to-date scientific information for the agency's regulatory decisions, and
c. build and maintain strong ties with the external research community and foster graduate student work in the environmental sciences.

Unfortunately EPA's research program is in a chronically unhealthy state. Despite major successful reforms in response to criticisms leveled in the 1980s and early 1990s, EPA's ability to garner the best science for its decisionmaking has been hamstrung by a severe lack of resources. This is particularly vexing given the desire of many policymakers to move away from a "command and control model" to a more flexible market-based approach to environmental performance. A market-based approach will only succeed if all participants have access to high quality science-based information on which to make their decisions. Additional science is needed to develop metrics of success and to monitor progress toward desired outcomes.

Funding for EPA's S&T account is projected to fall in 2008, 2009, and 2010 before rebounding slightly in 2011. After adjusting for inflation, EPA R&D could fall a further 16 percent over the next five years. Even if Congress adds to the administration's request during the appropriations process, congressional add-ons may end up going to earmarked projects rather than to boost core EPA research programs, leaving most EPA research on a downward path with further cuts to come. This situation is unsustainable and should be unacceptable to this committee.

**EPA's Extramural Science and Education Programs**

EPA created the extramural Science to Achieve Results (STAR) program as part of a set of reforms to EPA science proposed by the National Academy of Sciences in the 1990s. STAR provides EPA an opportunity to better take advantage of the intellectual and scientific resources of the academic community and apply these resources to the challenges faced by EPA.

The STAR program has been widely praised. The National Academies issued a laudatory report, *The Measure of STAR*, which concludes that the program supports excellent science that is directly relevant to the agency's mission. According to the report, the STAR program has "yielded significant new findings and knowledge critical for regulatory decision making." The report says, "The program has established and maintains a high degree of scientific excellence." It also concludes, "The STAR program funds important research that is not conducted or funded by other agencies. The STAR program has also made commendable efforts to leverage funds through establishment of research partnerships with other agencies and organizations."

The EPA STAR research program compares favorably with programs at other science agencies. According to the National Academies report, "The STAR program has developed a grant-award process that compares favorably with and in some ways exceeds that in place at other agencies that have extramural research programs, such as the National Science Foundation and the National Institute of Environmental Health Sciences."

The STAR research grants program expands the scientific expertise available to EPA by awarding competitive grants to universities and independent institutions, to investigate scientific

questions of particular relevance to the agency's mission. The National Academies report says, "The STAR program should continue to be an important part of EPA's research program."

From the standpoint of a university administrator, our ability to set priorities is greatly influenced by patterns of federal funding. Where resources are made available, academic research will flourish and new discoveries will be made. This is happening in the biomedical sciences and society is reaping the benefits of increased funding for biomedical research. In areas such as environmental science, even though there is great interest among student and faculty, it is hard for us to establish new programs and hire new faculty and take on additional students if we know that funding is not likely to be available. STAR grants that support research centers and individual scientists allow universities to make their own investments with some assurance of concurrent federal support.

Research centers funded by the STAR program at universities affiliated with NCSE are making scientific breakthroughs on topics including:

- remediation of mine waste sites
- microbial risk assessment
- remediation of volatile organic compounds in groundwater and soil
- air quality – reducing the health effects of particulate matter and aerosols
- assessment of aquatic resources
- children's environmental health and disease prevention (several centers).

Funding for the STAR program has been cut repeatedly over the past several years. The FY 2007 request for the STAR programs is $63 million, which is 40 percent below the FY 2004 request of $104.7 million. If the proposal is enacted, STAR will have been cut by $20 million (24 percent) since FY 2004. NCSE proposes that the STAR research budget be increased to $150 million, which would allow expansion of areas and scientists supported and would send a signal that Congress is serious about science for environmental decisionmaking.

To ensure a strong supply of future environmental scientists and engineers, EPA created the STAR Fellowship program. As you know, there is considerable concern about the retirements of the baby boom generation and the need to replace the scientific and technical skills of the federal, state and private work force. The STAR fellowship program is the *only* federal program aimed specifically at students pursuing advanced degrees in environmental sciences. According to the National Academies report, "The STAR fellowship program is a valuable mechanism for enabling a continuing supply of graduate students in environmental sciences and engineering to help build a stronger scientific foundation for the nation's environmental research and management efforts."

The STAR Fellowship program has also been repeatedly proposed for budget cuts by the Administration, only to be restored each year by Congress. The President's budget request has again has proposed deep cuts in the STAR graduate fellowship program. The budget request would have cut funding for the STAR graduate fellowship program by 50 percent in FY 2004

and by 100 percent in FY 2003. Congress restored full funding for the EPA STAR graduate fellowship program in both years. The FY 2007 proposed budget would be a $3.4 million (26 percent) reduction in funding for graduate fellowships. As you have noted in the committee's Views and Estimates on the budget, this is "one of the most troubling decreases". You state that "the fellowship program should be funded at $10 million, the level restored by Congress in each year beginning with FY 03."

The STAR fellowship program is highly competitive, with only 7 percent of applicants being awarded fellowships. The current level of funding is insufficient to allow all students whose applications are rated as excellent to receive fellowships and it is insufficient to meet national needs for a scientifically trained workforce. Based on the experience of NCSE staff as reviewers of the STAR fellowship applications, we recommend doubling the funding for STAR fellowships to $20 million, which can be accomplished without any decrease in the quality of the awardees.

**Office of Environmental Education**

The FY 2007 budget request once again proposes no funding for the EPA Office of Environmental Education. Since 2003, the Administration has tried to zero out this office, which support the programs mandated by the National Environmental Education and Training Act, programs administered by this office. NCSE strongly encourages Congress to restore full funding of at least $10 million. These programs provide national leadership for environmental education at the local, state, national and international levels, encourage careers related to the environment, and leverage non-federal investment in environmental education and training programs.

**Conclusion**

In order to fulfill its mission, EPA needs increased investments in both its intramural and extramural science programs. The National Council for Science and the Environment urges Congress to appropriate a minimum of $700 million for EPA's Office of Research and Development (bringing it back to FY 2004 levels), including at least $150 million for EPA's Science to Achieve Results (STAR) research grants program and $20 million for EPA's STAR graduate fellowship program. We recommend a total of $900 million for EPA's Science and Technology account. This would include the $62 million proposed transfer from the Environmental Programs and Management Account. NCSE also urges Congress to restore full funding for the Office of Environmental Education at a level of at least $10 million. Even these levels of funding would, for the most part, bring EPA science back to its level in FY 2004. We hope that in future years, EPA's science budget will grow to better match our national needs.

In the case of EPA, there is a strong relationship between input to environmental research and education and output in terms of environmental protection. If the nation wants more effective and efficient environmental protection, we need to make the upfront investment in science. It really is the ounce of prevention that is worth tons of cure.

## DONALD N. LANGENBERG

Donald N. Langenberg was educated at Iowa State University (B.S.), the University of California, Los Angeles (M.S.), and the University of California, Berkeley (Ph.D.). All his earned degrees are in physics. He also holds honorary degrees from the University of Pennsylvania (M.A. and D.Sc.) and from the State University of New York (D.Sc.).

After a postdoctoral year at Oxford University, Dr. Langenberg joined the faculty of the University of Pennsylvania in 1960, as Assistant Professor of Physics. He held the rank of Professor of Physics from 1967 to 1983, and had a secondary appointment as Professor of Electrical Engineering and Science from 1976 to 1983. While at Penn, he served as Director of the Laboratory for Research on the Structure of Matter (an interdisciplinary materials research laboratory) and as Vice Provost for Graduate Studies and Research.

In July 1980, President Jimmy Carter appointed Dr. Langenberg Deputy Director of the National Science Foundation. He served in that position through December, 1982, and served also as Acting Director of the Foundation during the first six months of his tenure.

On February 1, 1983, Dr. Langenberg became Chancellor of the University of Illinois at Chicago (UIC), where he also held the rank of Professor of Physics.

On July 1, 1990, Dr. Langenberg became Chancellor of the University System of Maryland. The System comprises eleven degree-granting institutions and two research and service units. He retired as Chancellor on April 30, 2002 to become Chancellor Emeritus and Regents' Professor of Education K-16. He also continues as Professor of Physics and Electrical Engineering at the University of Maryland, College Park.

Dr. Langenberg's research was in experimental condensed matter physics and materials science. His earliest research was concerned with the electronic properties and Fermi surfaces of metals and degenerate semiconductors. A major part of his research career was devoted to the study of superconductivity, particularly the Josephson effects and nonequilibrium superconductivity. He is perhaps best known for his work on the determination of certain fundamental physical constants using the ac Josephson effect. A practical consequence of this work was the development of a radically new type of voltage standard which is now in use around the world. One of the major publications resulting from this work is among the most frequently cited papers published by the Reviews of Modern Physics during the 1955-86 period, and has been dubbed a "citation classic." The work has also been recognized by the award to Dr. Langenberg and his co-workers of the John Price Wetherill Medal of the Franklin Institute. Dr. Langenberg is the author or co-author of over one hundred papers and articles, and has edited several books.

Dr. Langenberg has held predoctoral and postdoctoral fellowships from the National Science Foundation, the Alfred P. Sloan Foundation, and the John Simon Guggenheim Foundation. He has been a visiting professor or researcher at Oxford University, the Ecole Normale Supérieure, the California Institute of Technology, and the Technische Universität München. In addition to the Wetherill Medal, he has been awarded the Distinguished Contribution to Research Administration Award of the Society of Research Administrators, the Distinguished

Achievement Citation of the Iowa State University Alumni Association, and the Significant Sig Award of the Sigma Chi Fraternity.

Dr. Langenberg has served as advisor or consultant to a variety of universities, industrial firms, and governmental agencies. He is currently Chairman of the Board of Directors of The Education Trust, Vice Chairman of the Board of Directors of the National Council for Science and the Environment, and a member of the Board of Trustees of the University of the District of Columbia. He has been a member of the Board of Trustees of the Alfred P. Sloan Foundation; member of the Board of Trustees of the University of Pennsylvania; President of the National Association of System Heads (NASH); Chairman of the Presidents' Council of the Association of Governing Boards of Universities and Colleges (AGB); President and Chairman of the Board of the American Association for the Advancement of Science (AAAS); Chairman of the Board of the National Association of State Universities and Land-Grant Colleges (NASULGC); and President of the American Physical Society (APS).

Dr. Langenberg is a nationally recognized leader in education issues, particularly K-16 education partnerships and information technology as a revolutionary change agent in higher education. He was appointed chairman of the National Reading Panel (NRP) in 1998 by the U.S. Department of Education and the National Institute of Child Health and Human Development. The Panel was charged by Congress to study the effectiveness of various approaches to teaching children how to read and to report on the best ways of applying its findings in the classroom and the home. He currently serves as a member of the National Research Council Committee on the Study of Teacher Preparation Programs in the United States.

Dr. Langenberg was born March 17, 1932, in Devils Lake, North Dakota. Since 1953 he has been married to the former Patricia Warrington, a biostatistician who is currently Professor of Epidemiology and Preventive Medicine in the University of Maryland School of Medicine. They have four children: Karen, a marketing executive; Julia, a veterinarian; John, a physician; and Amy, a mother. Dr. Langenberg's avocational interests include photography, history, and travel; he has visited or resided on all seven continents.

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